

WE CLAIM:

1. A system for monitoring tissue condition comprising:
 - a housing configured to be implanted within the body, the housing including a first surface located on an outer side of the housing and a second surface located on an outer side of the housing;
 - a first sensing system configured to sense a physiological property of tissue proximate to the first surface;
 - a second sensing system configured to sense the same physiological property of tissue proximate to the second surface; and
 - a processing system in communication with the first and second sensing systems configured to compute a difference between the physiological property sensed by the first and second sensing systems.
2. The system of claim 1, wherein the first surface and second surface are on the housing lower surface.
3. The system of claim 1, wherein the first surface and second surface are on substantially opposite sides of the housing.
4. The system of claim 1, wherein the physiological property is temperature.
5. The system of claim 1, wherein the physiological property is oxygenation.
6. The system of claim 1, wherein the sensing system includes a system for computing perfusion.
7. The system of claim 1, wherein the physiological property is color.
8. The system of claim 1, wherein the physiological property is pH.
9. The system of claim 1, wherein the physiological property is NADH levels.
10. The system of claim 1, wherein the physiological property is prothrombin levels.

11. The system of claim 1, wherein the physiological property is biochemical composition.
12. The system of claim 1, wherein the sensing system includes a system for computing drug concentrations.
13. The system of claim 1, wherein the physiological property is turgidity.
14. The system of claim 1, wherein the physiological property is pressure.
15. The system of claim 1, further including at least one transmitting element configured to deliver energy to the tissue proximate to the first and second surface.
16. The system of claim 1, comprising a third sensing system configured to sense a second physiological property of tissue proximate to the housing that is different from the physiological property sensed by the first and second sensing systems.
17. The system of claim 1, wherein at least portions of the first and second sensing systems are embedded within the housing behind material that is optically transparent.
18. The system of claim 1, wherein the processing system is located within the housing.
19. The system of claim 1, wherein the processing system is external to the patient.
20. The system of claim 1, further including an antenna for receiving power.
21. The system of claim 1, further including an antenna for transmitting signals.
22. The system of claim 1, further including an antenna for receiving signals.
23. The system of claim 1, wherein the first and second sensing systems sense temperature and wherein the processing system is configured to compute the difference between the temperatures sensed by the first and second sensing systems.

24. The system of claim 1, further including a display configured to depict information about the physiological property sensed by the first or second sensing systems.

25. The system of claim 1, further including a display configured to depict data corresponding to a difference between the physiological property sensed by the first and second sensing systems.

26. The system of claim 1, wherein the first and second sensing systems include optical fibers.

27. The system of claim 1, further including an anchor configured to stabilize the position of the device relative to a tissue.

28. A system for monitoring tissue condition comprising:

a first device including a first housing configured to be implanted within the body, the first housing including a first surface, and a first sensing system configured to sense a physiological property of tissue proximate to the first device;

a second device including a second housing to be implanted within the body, the second housing including a second surface, and a second sensing system configured to sense a physiological property of tissue proximate to the second device; and

a processing system in communication with the first and second sensing systems configured to compute a difference between the physiological property sensed by the first and second sensing systems.

29. The system of claim 28, wherein the physiological property is temperature.

30. The system of claim 28, wherein the physiological property is oxygenation.

31. The system of claim 28, wherein the sensing system includes a system for computing perfusion.

- 32. The system of claim 28, wherein the physiological property is color.
- 33. The system of claim 28, wherein the physiological property is pH.
- 34. The system of claim 28, wherein the physiological property is NADH levels.
- 35. The system of claim 28, wherein the physiological property is prothrombin levels.
- 36. The system of claim 28, wherein the physiological property is biochemical composition.
- 37. The system of claim 28, wherein the sensing system includes a system for computing drug concentrations.
- 38. The system of claim 28, wherein the physiological property is turgidity.
- 39. The system of claim 28, wherein the physiological property is pressure.
- 40. The system of claim 28, further including at least one transmitting element configured to deliver energy to the tissue proximate to the first and second surface.
- 41. The system of claim 28, wherein the first device includes an additional sensing system configured to sense a second physiological property of tissue proximate to the first housing that is different from the physiological property sensed by the first sensing system.
- 42. The system of claim 28, wherein at least a portion of the first sensing system is embedded within the first housing behind material that is optically transparent.
- 43. The system of claim 28, wherein the processing system is external to the patient.
- 44. The system of claim 28, wherein the first device further includes an antenna for receiving power.

45. The system of claim 28, wherein the first device further includes an antenna for transmitting signals.

46. The system of claim 28, wherein the first device further includes an antenna for receiving signals.

47. The system of claim 28, wherein the first and second sensing systems sense temperature and wherein the processing system is configured to compute the difference between the temperatures sensed by the first and second sensing systems.

48. The system of claim 28, further including a display configured to depict information about the physiological property sensed by the first or second sensing systems.

49. The system of claim 28, further including a display configured to depict data corresponding to a difference between the physiological property sensed by the first and second sensing systems.

50. The system of claim 28, wherein the first and second sensing systems include optical fibers.

51. The system of claim 28, wherein the component includes an optical fiber.

52. The system of claim 28, wherein the first device further includes an anchor configured to stabilize the position of the device relative to a tissue.

53. The system of claim 28, wherein the first housing is permeable to fluid.

54. A method of monitoring the condition of a tissue comprising:

receiving information from a first sensing system and a second sensing system, wherein the first and second sensing systems are configured to sense a physiological property of a tissue;

processing information from the first and second sensing systems to compute a difference in information sensed by the first and second sensing systems; and

monitoring the information received from the first and second sensing systems to evaluate the condition of the tissue over time.

55. The method of claim 54, further including implanting a device within a body in proximity to tissue to be monitored, wherein the device includes the first sensing system and a second sensing system configured to sense a physiological property of tissue; and orienting the device such that the first sensing system senses the physiological property of a first region of a tissue, and the second sensing system senses the same physiological property from a second region of a tissue.

56. The method of claim 54, further including implanting a device within a body in proximity to tissue to be monitored, wherein the device includes the first sensing system and a second sensing system configured to sense a physiological property of tissue; and orienting the device such that the first sensing system senses the physiological property of a first tissue, and the second sensing system senses the same physiological property from a second tissue.

57. The method of claim 54, further including implanting a first device within a body in proximity to tissue to be monitored, wherein the first device includes the first sensing system; and implanting a second device proximate to a different region of the tissue monitored by the first device, wherein the second device includes the second sensing system configured to sense a physiological property of tissue.

58. The method of claim 54, further including implanting a first device within a body in proximity to a first tissue to be monitored, wherein the first device includes the first sensing system; and implanting a second device proximate to a second tissue, wherein the second device includes the second sensing system configured to sense a physiological property of a second tissue.

59. The method of claim 54, comprising displaying data regarding the difference between the information received from the first and second sensing systems.

60. The method of claim 54, comprising displaying data regarding a relationship between the information received from the first and second sensing systems.

61. The method of claim 60, wherein the relationship is correlation.

62. The method of claim 59, further comprising positioning an icon representing a device depicted on the display relative to a depiction of the tissue to indicate the position of the device within the body.

63. The method of claim 55 or 56, wherein implanting the device comprises placing the device on the surface of a tissue.

64. The method of claim 57 or 58, wherein implanting the first device comprises inserting the first device into the tissue.

65. The method of claim 55, wherein implanting the device occurs intraoperatively.

66. The method of claim 55, wherein implanting the device occurs postoperatively.

67. The method of monitoring the condition of a tissue comprising:

implanting a device within a body in proximity to a tissue to be monitored, wherein the device includes the first sensing system and a second sensing system, wherein the first and second sensing systems are configured to sense a physiological property of tissue; and

orienting the device such that the first sensing system senses the physiological property of a first region of a tissue, and the second sensing system senses the same physiological property from a second region of a tissue.

68. The method of claim 67, further comprising positioning an icon representing a device depicted on the display relative to a depiction of the tissue to indicate the position of the device within the body.

69. The method of monitoring the condition of a tissue comprising:

implanting a device within a body in proximity to tissue to be monitored, wherein the device includes the first sensing system and a second sensing system, wherein the first and second sensing systems are configured to sense a physiological property of tissue; and

orienting the device such that the first sensing system senses the physiological property of a first tissue, and the second sensing system senses the same physiological property from a second tissue.

70. The method of claim 69, further comprising positioning an icon representing a device depicted on the display relative to a depiction of the tissue to indicate the position of the device within the body.

71. The method of monitoring the condition of a tissue comprising:

implanting a first device within a body in proximity to tissue to be monitored, wherein the first device includes a first sensing system configured to sense a physiological property of a first tissue; and

implanting a second device proximate to a different region of the tissue monitored by the first device, wherein the second device includes the second sensing system configured to sense a physiological property of the different region of the tissue.

72. The method of claim 71, further comprising positioning an icon representing a device depicted on the display relative to a depiction of the tissue to indicate the position of the device within the body.

73. The method of monitoring the condition of a tissue comprising:

implanting a first device within a body in proximity to a first tissue to be monitored, wherein the first device includes the first sensing system configured to sense a physiological property of a first tissue; and

implanting a second device proximate to a second tissue, wherein the second device includes the second sensing system configured to sense a physiological property of a second tissue.

74. The method of claim 73, further comprising positioning an icon representing a device depicted on the display relative to a depiction of the tissue to indicate the position of the device within the body.